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A381
R31A
Cp. 3

ARS-73-6
Supplement 2

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

PUBLICATIONS AND PATENTS

OF THE

EASTERN UTILIZATION RESEARCH BRANCH

July - December 1955

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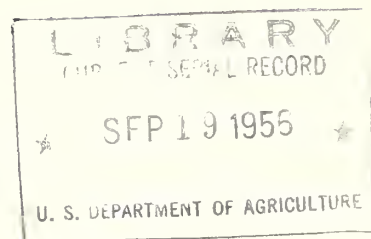
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Publications and patents of the Eastern Utilization Research Branch issued before 1951 are listed in AIC-180 and Supplements 1 to 6; publications and patents from 1951 through June 1954 are listed in AIC-320 and Supplements 1 to 6; publications from July 1954 through December 1955 are listed in ARS-73-6 and Supplements 1 and 2.

This list includes an index which covers AIC-180 and supplements, AIC-320 and supplements, and ARS-73-6 and supplements.



April 1956

1955

July - December

PUBLICATIONS

939. Ault, Waldo C.

VINYL PLASTICS MAY DEVELOP BIG NEW OUTLET FOR INEDIBLE FATS Western Meat Industry, 1 no. 9, 16-17 (1955).

The economic significance of the plasticizer market is discussed and possible methods for developing outlets for fat as plasticizers are noted.

940. Buch, M. L., Dryden, E. C., and Hills, Claude H.

CHROMATOGRAPHIC COMPARISON OF NONVOLATILE ACIDS OF FRESH AND STORED APPLE JUICE CONCENTRATE Agricultural and Food Chemistry, 3, 960-964 (1955).

The nonvolatile acids of fresh and of storage-darkened apple juice concentrate were separated by the use of paper chromatography following silicic acid partition chromatography. No difference could be detected in the acids between the fresh and the darkened concentrate. The use of three different solvent mixtures and six spray reagents for paper chromatography, together with 41 reference acids allowed tentative identification of galacturonic, quinic, phosphoric, citric, malic, chlorogenic, citramalic, caffeic, succinic, and lactic acids by their R_f values and colors produced with the spray reagents. Seven acids present in minor amounts were not identified.

941. Cordino, J., Jr., Willard, M. J., Jr., Eskew, R. K., and Sullivan, J. F.

POTATO FLAKES A NEW FORM OF DEHYDRATED MASHED POTATOES. II SOME FACTORS INFLUENCING TEXTURE. U. S. Dept. Agr., Agr. Research Service Circ. ARS-73-9; 8 pp. (August 1955).

Published also as: RECENT DEVELOPMENTS IN THE POTATO FLAKE PROCESS Food Technology, 9, 520-521 (1955).

The processing variables in the pilot-plant production of potato flakes are discussed from the standpoint of their effect on texture of the reconstituted mash. Precooking of the raw potato slices at temperatures below 212° F. makes it possible to increase and control mealiness in the reconstituted product and permits use of potatoes of lower solids content not suitable heretofore for dehydrated mashed potato production. Effects of time and temperature of precooking are given in detail. The effects of other factors, flake thickness, dryness, density and size, are reviewed.

942. Craig, L. E., Kleinschmidt, R. F., Miller, E. S., and Wilkinson, J. M., Jr. (General Aniline and Film Corp., Easton, Pa.), Davis, R. W., and Montross, C. F. (General Aniline and Film Corp., Linden, N. J.), and Port, William S. (EURB)

LONG-CHAIN VINYL ESTERS AND ETHERS. PREPARATION FROM COMMERCIAL RAW MATERIALS. Industrial and Engineering Chemistry, 47, 1702-1706 (1955).

Redfield, Clifford S., Port, William S., and Swern, Daniel

LONG-CHAIN VINYL ESTERS AND ETHERS. COST ESTIMATE ON TECHNICAL GRADE VINYL STEARATE. Ibid., 1707-1710.

The first part of this paper describes the large-scale laboratory preparation in high yield of vinyl stearate, vinyl oleate, vinyl octadecyl ether and vinyl oleyl ether from acetylene and the appropriate commercial grade of long-chain acid or alcohol. The work shows the commercial feasibility of synthesizing these monomers of sufficient purity to ensure polymerizability. The basic raw materials (acetylene and tallow) from which these monomers are made are inexpensive and readily available. In the copolymers prepared from these long-chain compounds, the long chain is chemically bound in the polymer molecule, and the resulting intramolecularly modified polymers should retain their original properties practically indefinitely, as compared with changes encountered in plasticized polymer compositions due to exudation, evaporation, and leaching.

The second part of this paper attempts to answer certain questions regarding the cost of production and sale of vinyl stearate. At a production rate of 5,000,000 pounds per year, it should be possible to build a plant, manufacture, and sell vinyl stearate at a profit, after taxes, for about \$0.43 per pound; at an annual production rate of 10,000,000 pounds, the selling price should be \$0.31-0.34 per pound. These cost estimates are based on laboratory data and are preliminary. It is assumed that a return of 12% on the investment, after taxes, will be earned.

943. Eddy, C. Roland, Barnes, Mary-Anne, and Fenske, Charles S.

CATALOG OF INFRARED SPECTRA OF 20-ISOSAPOGENIN ACETATES. Analytical Chemistry, 27, 1067-1069 (1955).

A new series of sapogenins, epimeric with the natural sapogenins at carbon atom 20, was discovered at this laboratory and reported a short while ago. As a means of characterizing these new compounds, the infrared spectra have been obtained. In this paper, the spectra of ten of the 20-isapogenins are presented, as the acetates. The spectra contain much characteristic detail and can be used for ready identification of these compounds.

944. Eisner, Abner, Scanlan, John T., and Ault, Waldo C.

THE SODIUM REDUCTION OF WOOL WAX. Journal of the American Oil Chemists' Society, **32**, 556-558 (1955).

A process for the sodium reduction of various grades of lanolin and wool grease is described. A method of recovery is included which satisfactorily solves the emulsion problem usually encountered with products of this type.

945. Fields, M. D., Dunker, C. F., and Swift, C. E.,

THE EFFECT OF STORAGE ON THE COMPOSITION AND NUTRITIVE PROPERTIES OF FARM-STYLE HAMS. Food Technology, **9**, 491-495 (1955).

The results obtained in an investigation of the composition, nutritive value, and keeping quality of hams dry cured with salt only are presented. The hams were cured and smoked and then stored at 40°, 70° and 90° F., for 6 weeks, and for 6- and 12-month periods. Data obtained on weight losses, chemical constituents, nitrogen efficiency value, vitamin content, palatability, and bacteriological flora, are discussed.

946. Ford, T. F., Ramsdell, G. A., and Klipp, Lorraine W.

AN AIR-DRIVEN, AIR-FLOATED CAPILLARY TUBE ULTRACENTRIFUGE. Journal of Physical Chemistry, **59**, 922-929 (1955).

An air-driven, air-floated ultracentrifuge of the Henroit and Huguenard type is described. The rotor is constructed with opposed radial holes in which glass capillary cells are inserted. The rotor may be stopped at appropriate intervals during the course of centrifugation, and the tubes removed and photographed. A simple optical system utilizing a horizontally mounted research microscope is used to obtain scattered light, absorption, and schlieren pictures. Sedimentation velocity results reported on earthworm blood, snail blood, and tobacco mosaic virus protein are in good agreement with results reported using other ultracentrifuges. The temperature at the position of the cell is essentially the same as the room temperature. Diffusion constants can be calculated from photographic schlieren records. Asymptotic packing volumes of the sedimented erythrocytes of worm blood and of the colloidal proteins of milk can be measured from photographs of the cells after centrifugation at increasing centrifugal forces.

947. Ford, T. F., Ramsdell, G. A., and Landsman, Shirley G.

COMPOSITION OF THE CASEIN-CONTAINING PARTICLES IN MILK. *Journal of Dairy Science*, **38**, 843-857 (1955).

It is well known that casein exists in milk in large aggregates. The purpose of this paper is to provide data on the chemical composition of these aggregates in relation to their size. Separation was achieved by centrifugation. The following chemical determinations were carried out on the separated material and on the residual liquids: total nitrogen, casein nitrogen, calcium, total phosphorus, trichloroacetic-acid-soluble phosphorus, lactose, fat, and total solids.

948. Gordon, William G., and Ziegler, Jacob

α -LACTALBUMIN. *Biochemical Preparations*, **4**, 16-23 (1955).

Detailed directions are given for the preparation of crystalline α -lactalbumin from skimmed milk.

949. Gordon, William G., and Ziegler, Jacob

AMINO ACID COMPOSITION OF CRYSTALLINE α -LACTALBUMIN. *Archives of Biochemistry and Biophysics*, **57**, 80-86 (1955).

The amino acid composition of α -lactalbumin has been determined by chromatography on Dowex 50 resin. Outstanding features of its composition are high contents of aspartic acid and tryptophan and low contents of arginine, methionine, and proline. The analytical results yield a molecular weight of 15,500, in good agreement with physical measurements.

950. Kelley, Edward G., and Baum, Reba R.

PREPARATION OF TASTY VEGETABLE PRODUCTS BY DEEP-FAT FRYING. *Food Technology*, **9**, 388-392 (1955).

Vegetable chips, similar to potato chips, have been made from beets, carrots, and parsnips. Deep-fat fried pea and lima bean embryo chunks have been prepared from over-mature canning or freezing varieties of peas and lima beans. The best conditions for cooking of these tasty vegetable snack items have been worked out and the products have been evaluated. Yields, oil contents, and crude protein values have been found for all five vegetables. Carotene losses in carrot chips have been determined. Tasty soup bases, which rehydrate in about three minutes, have been made from fried pea and lima bean powders with flavor additives.

951. Luddy, Francis E., Morris, S. G., Magidman, P., and Riemenschneider, R. W.

EFFECT OF CATALYTIC TREATMENT WITH SODIUM METHYLATE ON GLYCERIDE COMPOSITION AND PROPERTIES OF LARD AND TALLOW. Journal of the American Oil Chemists' Society, 32, 522-525 (1955).

Lard and tallow were treated with sodium methylate under conditions favorable to ester interchange. The effect of this treatment on the glyceride composition and chemical and physical properties was studied. The glyceride composition of lard was altered considerably, resulting in nearly random distribution, while beef tallow remained almost unaffected by the treatment.

952. Naghski, J., and Couch, J. F. (EURB), Taylor, J. W., and Sando, W. J. (Field Crops Research Branch), White, J. W., Holben, F. J., and Washko, J. B. (Penna State University)

EFFECTS OF AGRONOMIC FACTORS ON THE RUTIN CONTENT OF BUCKWHEAT. United States Department of Agriculture Technical Bulletin No 1132, 50 pp., October 1955.

A study of five varieties of buckwheat on five different soils over a three-year period showed that the usual method of planting for production of grain was also optimum for production of rutin. The Tartary, Tetraploid and Emarginatum varieties had a higher percentage of rutin in the plant, did not lose the rutin so rapidly with maturity and produced higher yields of rutin per acre than the Japanese and Silverhull. Young plants of all varieties contained a higher percentage of rutin and also a higher proportion of leaves than mature plants. The rutin content decreased rapidly with the onset of seed formation. Buckwheat planted early in the spring had a higher percentage of rutin than that planted later in the year. The value of several fertilizer treatments on the production of rutin varied more with the nature of the respective soil than with the variety of buckwheat.

953. Parker, W. E., Koos, R. E., and Swern, Daniel

LINOLEIC ACID AND METHYL LINOLEATE. Biochemical Preparations, 4, 86-90 (1955)

Concentrates of linoleic acid and methyl linoleate (linoleic content, 92-95%) are prepared in good yield from safflowerseed oil fatty acids or methyl esters by preferential precipitation of the oleic and saturated components as insoluble crystalline urea complexes

954. Parker, Winfred E., Ricciuti, Constantine, Ogg, C. L., and Swern, Daniel

PEROXIDES. II. PREPARATION, CHARACTERIZATION AND POLAROGRAPHIC BEHAVIOR OF LONG-CHAIN ALIPHATIC PERACIDS. Journal of the American Chemical Society, **77**, 4037-4041 (1955).

A new procedure for the preparation of aliphatic peracids is described. This consists in the reaction of fatty acids with 0.5-2.0 moles of 50-65% hydrogen peroxide in concentrated sulfuric acid solution. Kinetics of decomposition of eight peracids in methanol-benzene have been determined.

955. Porges, Nandor

RAPID BIO-OXIDATION METHOD OF WASTE DISPOSAL. 1955 Proceedings of American Society of Brewing Chemists, p. 56-64.

The composition and oxygen demand of brewery waste indicate its possible treatment by the rapid bio-oxidation method developed for disposal of dairy waste. The principles and theories on the treatment of dairy waste are reviewed and summarized. Equations concerning oxygen utilization by organic waste are given. Application of the data is detailed and information is presented on industrial installation for dairy waste disposal.

956. Porges, N., Jasewicz, L., and Hoover, S. R.

BIOCHEMICAL OXIDATION OF DAIRY WASTES. VII. PURIFICATION, OXIDATION, SYNTHESIS AND STORAGE. Proceedings of 10th Industrial Waste Conference, May 1955, Engineering Dept. Ext. Series No. **89**, Purdue Univ., p. 135-146.

Purification of a waste consists of three interrelated processes: oxidation, synthesis, and storage. The use of the equation of synthesis permits the estimation of the C.O.D. actually stored or not assimilated. Carbohydrates of the waste are rapidly converted to storage glycogen as determined chromatographically and chemically. As much as 50% of its own dry weight may be stored by the sludge. The stored material is in turn rapidly oxidized. This storage and oxidizing ability may find possible application for rapid purification and subsequent oxidation of low nitrogen-containing wastes.

957. Riemenschneider, R. W.

DETERMINATION OF TRIGLYCERIDE COMPOSITION OF FATS. Journal of the American Oil Chemists' Society, **32**, 678-684 (1955).

Two methods for determining triglyceride composition of fats are discussed. One method is based on systematic crystallization of fats from acetone at different low temperatures, the other on oxidation of the fat to azelao-glycerides and fractionation of the latter through their magnesium salts. Several hypotheses of natural glyceride distribution are discussed in relation to experimental data.

958. Roe, Edward T., and Swern, Daniel

FATTY ACID AMIDES. VII. ADDITION OF HYDROGEN CYANIDE TO UNSATURATED ACID ACIDS. PREPARATION OF FORMAMIDO ACIDS, AMINO ACID SULFATES AND AMINO ACIDS. Journal of the American Chemical Society, **77**, 5408-5410 (1955).

Liquid hydrogen cyanide has been added to the double bonds of oleic, 10-hendecenoic and ricinoleic acids in 85-95% sulfuric acid to give good yields of formamidostearic, formamidohendecenoic, and hydroxyformamidostearic acids, respectively. The first two are rapidly hydrolyzed by refluxing with aqueous sulfuric acid to give the corresponding amino acid sulfates in high yield. These can be converted to the free amino acids by neutralization.

959. Roger, N. F., Griffin, E. L. Jr., Redfield, C. S. (EURB), and Koepp, W. H. (Michigan College of Mining and Technology)

PULP CHIPS AND TANBARK FROM HEMLOCK SLABS BY AIR-FLOTATION. Forest Products Journal, **5**, 400-405 (1955).

The almost complete dependence of our leather-making industry on foreign vegetable tanning materials, together with the increasing pulpwood demand by the pulp and paper industry, give the utilization of hemlock sawmill wastes a dual interest. The effect of slab seasoning on the separation of bark and wood during chipping, a prerequisite to efficient segregation by the air-flotation method, is described. A process has been developed which is capable of separating hemlock slabs into a bark fraction suitable for tannin extraction and a wood fraction for pulping. A flow sheet and cost estimate for a proposed plant are presented.

960. Sager, Oscar S., Sanders, George P., Norman, G. H., and Middleton, Moses B.

A DETERGENT TEST FOR THE MILK FAT CONTENT OF DAIRY PRODUCTS. I. MILK, CREAM, AND ICE CREAM. Journal of the Association of Official Agricultural Chemists, **38**, 931-940 (1955).

Changes have been made in the original BDI detergent test for butterfat, improving the methodology, accuracy, and appearance of the test and increasing its usefulness. The modified test is known as the DPS (Dairy Products Section) detergent test for butterfat. Changes include addition of 2% sodium bicarbonate to the detergent-tetraphosphate reagent, slight changes in the heating and shaking procedure, and shortening of the "tempering" period. The modified procedure for whole milk, cream, and ice cream is presented. Fat values obtained with the DPS test on milk and on ice cream checked closely, within experimental error, those obtained with the Babcock and Roese-Gottlieb tests, respectively. Results of detergent tests on cream, conducted in silicone-treated bottles to flatten the bottom meniscus, averaged the same as Babcock test results and averaged 0.25% higher than Roese-Gottlieb results.

961. Schwartz, Joseph H., and Wall, Monroe E.

ISOLATION OF THE STEROLS OF THE WHITE POTATO. Journal of the American Chemical Society, 77, 5442-5443 (1955).

Maine Katahdin potatoes were found to contain 0.002% sterols on a dry basis. β -Sitosterol was identified as the major sterol. A small amount of stigmasterol was also present.

962. Swern, Daniel

OXYGENATED FATTY ACIDS. Chapter in "Progress in the Chemistry of Fats and Other Lipids," vol.3, London, Pergamon Press, 1955 (p. 213-241).

The oxygenated fatty acids are reviewed. The classes of compounds described are epoxy acids; monohydroxy, dihydroxy, and polyhydroxy acids; and keto acids. The discussion includes their occurrence and isolation from natural sources or methods of preparation, physical and chemical characteristics, commercial utility, if any, and application to isomerism and structure studies.

963. Swern, Daniel, and Coleman, Joseph E.

REACTIONS OF FATTY MATERIALS WITH OXYGEN. XX. RECENT DEVELOPMENTS IN THE AUTOXIDATION OF METHYL OLEATE AND OTHER MONOUNSATURATED FATTY MATERIALS. Journal of the American Oil Chemists' Society, 32, 700-703 (1955).

Some significant developments since 1947 in the autoxidation of methyl oleate and other monounsaturated fatty materials have been reviewed and critically evaluated. Subjects discussed are preparation and characterization of hydroperoxides, and mechanism, kinetics, and secondary products of autoxidation.

964. Swern, Daniel, Witnauer, Lee P., Eddy, C. Roland, and Parker, Winfred E.

PEROXIDES. III. STRUCTURE OF ALIPHATIC PERACIDS IN SOLUTION AND IN THE SOLID STATE. AN INFRARED, X-RAY DIFFRACTION AND MOLECULAR WEIGHT STUDY. Journal of the American Chemical Society, 77, 5537-5541 (1955).

Infrared absorption spectra have been obtained on long-chain aliphatic peracids in solution and in the solid state, and x-ray diffraction patterns have been obtained on the solid peracids. Infrared studies have shown that in solution the peracids exist exclusively as intramolecularly chelated monomers containing a five-membered ring. In the solid state the peracids, like the corresponding *n*-aliphatic acids and alcohols, occur as dimers in which two of the monomer units are linked through intermolecular hydrogen bonds.

965. Swern, Daniel, and Witnauer, Lee P (EURB), and Fusari, S A, and Brown, J. B (Ohio State Univ).

X-RAY DIFFRACTION AND MELTING-POINT DATA ON SOME BINARY MIXTURES OF OF TRANS-3 THROUGH 12-OCTADECENOIC ACIDS AND THEIR DIHYDROXYSTEARIC ACIDS Journal of the American Oil Chemists' Society, 32, 559-540 (1955).

X-ray diffraction and melting-point data are reported on some binary mixtures of trans-3 through 12-octadecenoic acids and their dihydroxystearic acids

966. Treadway, R H, Heisler, E G, and Whittenberger, R. T (EURB), and Highlands, M E and Getchell, J. S (Maine Experiment Station).

NATURAL DEHYDRATION OF CULL POTATOES BY ALTERNATE FREEZING AND THAWING American Potato Journal, 32, 293-303 (1955)

Natural freeze-drying of potatoes, when properly carried out, seems practicable in northern areas for converting cull potatoes into a partially stable feed, thus extending the potato feeding period into late spring and early summer. Spreading the tubers in a thin layer on the ground is apparently the most feasible method of exposure. The amounts of various nutrients lost by the potatoes during freeze-drying were determined.

967. Turkot, Victor A, Sinnamon, Howard I, Eskew, Roderick K, and Phillips, G. W. Macpherson.

STORAGE BEHAVIOR OF POWDERED APPLE AND GRAPE JUICE PRODUCTS Food Technology 9 503-509 (1955)

Data are presented on the flavor stability and extent of caking of powdered apple and grape juice products during storage for periods of up to one year at 73°F and up to 6 months at 100°F., in 4-ounce cans. If moisture content when canned is low enough or is lowered sufficiently through inpackage desiccation after canning, both flavor retention and freedom from caking are quite satisfactory.

968. Walens, Henry A, Serota, Samuel, and Wall, Monroe E.

STEROIDAL SAPOGENINS. XXXI. GENTROGENIN AND CORRELLOGENIN, NEW SAPOGENINS FROM *DIOSCOREA SPICULIFLORA* Journal of the American Chemical Society, 77, 5196-5197 (1955).

Two new steroidal sapogenins have been isolated from *Dioscorea spiculiflora*, from southern Mexico. They have been named gentrogenin and correllogenin, after H. S. Gentry and D. S. Correll, the botanists who collected the plants. The properties and chemical structures of the two steroids are given.

969. Wall, Monroe E.

STEROIDAL SAPOGENINS. XXX. STEREOCHEMISTRY OF THE SIDE CHAIN.
Experientia, 11, 340-342 (1955).

An analysis of optical rotation data shows that sarsasapogenin and smiladenin differ only at C₂₅ whereas their 20-iso analogues differ both at C₂₂ and C₂₅.

970. Wall, Monroe E., Fenske, C. S., Willaman, J. J. (EURB), and Correll, D. S., Schubert, B. G., and Gentry, H. S. (Horticultural Crops Research Branch).

STEROIDAL SAPOGENINS. XXV. SURVEY OF PLANTS FOR STEROIDAL SAPOGENINS AND OTHER CONSTITUENTS. Journal of the American Pharmaceutical Association, Scientific Edition, 44, 438-440 (1955).

This is a report of the chemical examination of the third 1000 plant samples received in a survey for steroidal sapogenins. Data are given for 954 lots of plant material, representing 506 identified species, 160 identified as to genus only, 348 genera and 96 families. There is no previously published chemical information on about 50% of the species. Quantitative data are given for the occurrence of 14 steroidal sapogenins and qualitative tests for the occurrence of saponins, flavonoids, alkaloids, tannins, and unsaturated sterols.

971. Wall, Monroe E., Fenske, C. S., and Willaman, J. J. (EURB), and Correll, D. S., Schubert, B. G., and Gentry, H. S. (Horticultural Crops Research Branch).

STEROIDAL SAPOGENINS. XXVI. SUPPLEMENTARY TABLE OF DATA FOR STEROIDAL SAPOGENINS XXV. U. S. Dept. Agr., Agr. Research Service Circ. ARS-73-4; 30 pp. (September 1955).

A table of data supplementary to Steroidal Sapogenins XXV. It covers the third 1000 plant accessions received in the search for steroidal sapogenins. It gives the identification and origin of the samples, the results of hemolysis tests for saponins, the kinds and amounts of steroidal sapogenins, and qualitative finds for flavonoids, alkaloids, tannins, and sterols.

972 Wall, Monroe E., Kenney, Harold E., and Rothman, Edward S.

STEROIDAL SAPOGENINS. XXVIII. CONVERSION OF STEROIDAL SAPOGENINS TO Δ^{16} -20-KETO-PREGENES. Journal of the American Chemical Society, 77, 5665-5668 (1955).

The three-step conversion of steroidal sapogenins (I) to Δ^{16} -20-keto-pregenes (VII) has been systematically studied. Treatment of I with acetic anhydride gave pseudosapogenin (II) in high yield. Oxidation of II with CrO_3 or H_2O_2 gave the oxidation intermediate (III) and smaller quantities of VII, 16, 17- α -epoxides (X), and some unidentified products. Alkaline hydrolysis of pure III with t-butanol-potassium hydroxide proceeded quantitatively. This reagent had no effect on pure compounds of type VII with or without a C-12 carbonyl. This paper presents complete physical properties of a number of type VII compounds prepared from various sapogenins and of their C 16-17 saturated analogues.

973 Wall, Monroe E., and Walens, Henry A.

STEROIDAL SAPOGENINS. XXVII. PREPARATION AND PROPERTIES OF 20-ISOSAPOGENINS. Journal of the American Chemical Society, 77, 5661-5665 (1955).

This paper describes the preparation and properties of a number of 20β , 25^D - and 20β , 25^L -sapogenins. The latter are characterized by being much more dextrorotatory than their 25^D analogues. Both series have infrared spectra which differ from each other and from those of the analogous 20α compounds. Sapogenins of the 20β series are characterized by a spiroketal side chain which is much more labile than the 20α series. Thus the latter group is not attacked by mild CrO_3 oxidation. Sapogenins of the 20β , 25^L series are cleaved to acidic intermediates which on alkaline treatment yield Δ^{16} -20 keto-pregenes. Compounds of the 20β , 25^D group behave similarly but in addition also yield on oxidation a new group of sapogenins which contain an additional hydroxyl tentatively placed at C_{20} . 20-Isohecogenin is an exception and forms only the hydroxylated derivative. The cleavage fragments of 20β , 25^L and 20β , 25^D -sapogenins gave (+)- and (-)- α -methylglutaric acids, thus establishing the C_{25} configuration of both groups.

974. Willaman, J. J.

SOME BIOLOGICAL EFFECTS OF THE FLAVONOIDS. Journal of the American Pharmaceutical Association, Scientific Edition, 44, 404-408 (1955).

There are known at present at least 137 natural flavonoids, occurring in at least 62 families, 153 genera, and 277 species of plants. About 33 different types of physiological and biochemical activities have been reported for one or another of 30 of these flavonoids. This paper summarizes these activities and what is known about the relation of structure to such activities. It is suggested that this is a fruitful field for further research.

975. Willits, C. O.

REPORT ON METHODS FOR MAPLE PRODUCTS. Journal of the Association of Official Agricultural Chemists, 38, 597-603 (1955).

A report is made of the 1954 A.O.A.C. collaborative study of P_2O_5 and K_2O analysis as criteria of purity of maple sirup. The study involved the analysis of three sirups, one pure maple and two that were adulterated. The study shows that when used alone, K_2O and conductivity analyses are unreliable, while the P_2O_5 analysis holds considerable promise. Recommendations for further work are presented.

976. Witnauer, Lee P., Knight, H. B., Palm, W. E., Koos, R. E., Ault, W.C., and Swern, Daniel.

EPOXY ESTERS AS PLASTICIZERS AND STABILIZERS FOR VINYL CHLORIDE POLYMERS. Industrial and Engineering Chemistry, 47, 2304-2311 (1955).

Approximately 32 epoxy esters have been prepared from fats and have been evaluated as plasticizers and stabilizers for polyvinyl chloride resins. A new class of all-purpose primary plasticizers, namely, epoxidized diacetomoglycerides, has been prepared and evaluated. With respect to low temperature characteristics and efficiency, outstanding compounds are 2-ethylbutyl epoxystearate, epoxidized butyl esters of tall oil, methoxyethyl epoxystearate, acetoxyethyl epoxystearate, glycidyl epoxystearate, tetrahydrofurfuryl epoxystearate, cyclohexyl epoxystearate, phenyl epoxystearate and benzyl epoxystearate.

977. Zittle, Charles A., and DellaMonica, Edward S.

SEPARATION OF PROTEINS BY GRADIENT SOLVENT EXTRACTION OF A PROTEIN
PRECIPITATE. Archives of Biochemistry and Biophysics, **58**, 31-36 (1955).

A mixture of bovine serum albumin and human hemoglobin is used to show the applicability of the gradient extraction method for the separation of proteins. The mixture is precipitated with ammonium sulfate and serially extracted with the same solvent continuously diluted with water. The method has also revealed a reduction in the solubility of α -lactalbumin when it is dried from the frozen state. Equipment for accomplishing the continuous dilution is described as well as calculations of the concentrations to be expected.

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Patents

Copies of patents may be purchased from

The United States Patent Office, Washington 25, D.C.

Eskew, Roderick K., and Claffey, Joseph B.

PROCESS FOR MAKING MAPLE SIRUP. U. S. Patent No. 2,718,469, issued September 20, 1955.

Fontaine, Thomas D., and Doukas, Harry M.

SYNTHESIS OF SAPOGENIN DERIVATIVES. U. S. Patent No. 2,716,116, issued August 23, 1955.

Griffin, Edward L., Jr., Sinnamon, Howard I., and Willard, Miles J.

PROCESS FOR PREPARATION OF ALLYLSUCROSE. U. S. Patent No. 2,719,970, issued October 4, 1955.

Hargrove, Robert E., and Leviton, Abraham

PROCESS FOR THE MANUFACTURE OF VITAMIN B₁₂. U. S. Patent No. 2,715,602, issued August 16, 1955.

Rothman, Edward S., and Wall, Monroe E.

EXTRACTION OF SAPONINS FROM YUCCA BACCATA. U. S. Patent No. 2,715,122, issued August 9, 1955.

Swern, Daniel

UNSATURATED FATTY ACID ESTERS OF ALLOXY HYDROXYBUTENES, U. S. Patent No. 2,715,132, issued August 9, 1955.

Wall, Monroe E.

ISOLATION OF SAPOGENINS. U. S. Patent No. 2,719,845, issued October 4, 1955.

Willits, Charles O., and Porter, William L.

PRODUCTION OF MAPLE SUGAR PRODUCTS HAVING ENHANCED FLAVOR. U. S. Patent No. 2,715,581, issued August 16, 1955.

Index to publications listed in ARS-73-6 and Supplements 1 and 2, AIC-180 and Supplements 1 through 6, and AIC-320 and Supplements 1 through 6 (1939 through June 1955). The numbers refer to the numbers of the publications in the lists; for those with an asterisk, reprints were not available at the time the index was prepared.

I. FRUITS AND VEGETABLES

A. Apples and other eastern fruits

1. Apple essence; recovery and use
78*, 201*, 322, 379*, 587, 752, 867*
2. Apple essence; composition
442
3. Apple essence; alcohol content
295, 404*, 478
4. Apple essence; dependence on apple variety
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